Space Weather Forecast

Issued on Saturday, 30 September 2023 at 13:27 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-flares throughout. Chance of G1 Minor Storm conditions on day 3 (02 Oct).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low with mainly low level common class flares observed. The peak flare was 30/1157 UTC from a yet to be determined source. Before this, the peak flare was from a newly emerged region on the northeast limb. There are eight sunspot regions on the disc. The most notable is in the southeast, and has seen some small growth with a moderately complex magnetic structure, although it remains a relatively small and inactive region. A further region, approaching centre disc has remained stable despite a slightly more complex magnetic structure, with mixed polarity intermediate spots. A notable proportion of the recent common class flaring has been focused on two small regions emerging in the northeast however, along with visible magnetic looping from a likely region over the northeast limb.

No Earth-directed CMEs (coronal mass ejections) have been observed.

Solar Wind / Geomagnetic Activity: Solar winds eased from slightly elevated levels to near background with speeds easing from 450-480km/s to around 380-420 km/s. The interplanetary magnetic field (IMF) was weak and easing. The north-south component was weakly positive (northward) at first, then increasingly variable from 29/1930 UTC, before becoming predominately negative (southward) from around 30/0430 UTC. Resultant geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels, with no Solar Radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Activity is expected to remain at Low to Moderate levels, with a chance of isolated Moderate-class flares.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs. The next notable enhancement is most likely to occur on day 3 (02 Oct) due to the arrival of the fast winds from a coronal hole. This feature is currently in the northwest disc, but with a southeastern extended lobe which has a greater potential for a geoeffective connection later in the period. Mainly Quiet geomagnetic activity with isolated Unsettled spells is expected, increasing to Unsettled to Active with a chance of G1 Minor Storms on day 3, before reducing back to mainly Quiet to Unsettled levels on day 4 (03 Oct).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background levels, but with a very slight chance of minor Solar Radiation storms.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	10	30	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	40	40	40
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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